MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2017/2018

BMR3174 – SUPPLY CHAIN MANAGEMENT
(All sections / Groups)

14 MARCH 2018
2.30 p.m - 4.30 p.m
(2 Hours)

INSTRUCTIONS TO STUDENTS:

1. This Question paper consists of 7 pages only.

2. **Section A:** Answer all **TWO (2)** questions.

   Section B: Answer any **TWO (2)** of **THREE (3)** questions.

3. The distribution of the marks for each question is given at the end of each question.

4. Please write all your answers in the Answer Booklet provided.

SECTION A:
INSTRUCTION: ANSWER ALL TWO (2) QUESTIONS (50 MARKS)

QUESTION 1

GGG has two retail outlets, namely AAA and BBB. GGG has a plan to build a new third retail outlet in either Merlimau Mall (MM) or Anggun Mall (AM). Transportation costs for the locations and costs, demands and supplies for the existing warehouses – Alpha (A), Beta (B) and Gamma (G) are shown below (Table 1.1).

While maintaining the existing AAA and BBB outlets, use the following table to find the total shipping costs for the potential new retail outlet.

Students are required to

a) use the NORTHWEST method to build the initial solution for each combination (Combination 1 – AAA, BBB and AM; Combination 2 – AAA, BBB and MM).

(8 marks)

b) and proceed with STEPPING STONE method for optimization for each combination. Students are required to show all the improvement indexes leading to lowest transportation cost and then calculate the transportation cost.

(16 marks)

c) which combination is better?

(1 marks)

[Total: 25 marks]

Table 1.1: Projection of Travelling Cost for two proposed locations

From	Warehouses			Capacity
	Alpha (A)	Beta (B)	Gamma (G)	
Existing Outlets				
AAA	15	10	14	400
BBB	9	7	18	500
Proposed New Outlet				
AM	4	11	5	300
MM	7	6	5	300
Demand	660	340	200	

Continued...

QUESTION 2

The figure 2.1 and table 2.1 below illustrates the floor layout of FOB building at level four. The management decides to improve students' movement in the faculty, using the layout strategy. Assume all lecture halls are equal-sized. Currently, FOB assigns each lecture hall with a subject, for instance, MAMR 4001 with subject A, MAMR 4002 with subject B and so on.
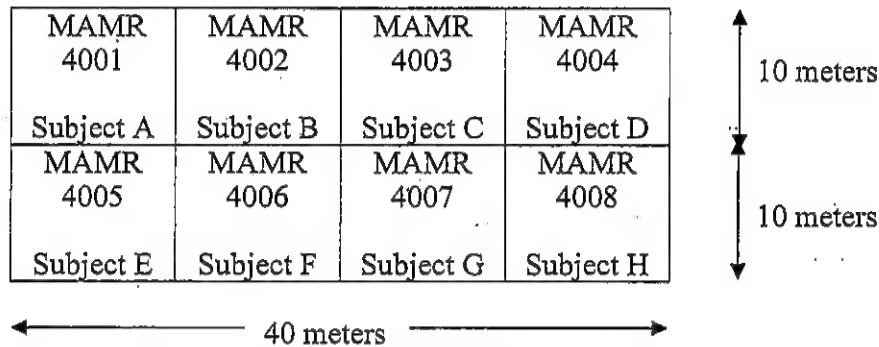
MAMR 4001	MAMR 4002	MAMR 4003	MAMR 4004
Subject A	Subject B	Subject C	Subject D
MAMR 4005	MAMR 4006	MAMR 4007	MAMR 4008
Subject E	Subject F	Subject G	Subject H

10 meters

10 meters

← 40 meters →

Figure 2.1: Floor Plan of FOB

Table 2.1: Closeness Matrix

Subjects	Number of Students Movements (Trips) Between Subjects							
	A	B	C	D	E	F	G	H
A	-	100	100	-	-	-	-	-
B		-	-	50-	20	-	-	-
C			-	30	30	-	-	-
D				-	20	-	-	20
E					-	20	-	10
F						-	30	-
G							-	-
H								-

Develop

1) A weighted-distance score for initial layout.

(10 marks)

2) Reassign all the subjects to improve students' movement. What is its total weighted-distance score of the new layout? The total weighted-distance **SHOULD NOT EXCEED 6300m**.

(15 marks)

[Total: 25 marks]

Continued...

SECTION B:
INSTRUCTION: ANSWER ANY TWO (2) QUESTIONS (50 MARKS)

QUESTION 3

Based on the forecast information (Table 3.1 and 3.2) for the product A, identify which plan yields the lowest production cost.

Table 3.1: Forecast Aggregate Demand for Product A

Month	Demand
Jan	250
February	160
March	150
April	190
May	320
June	290

Table 3.2: Operating Cost

Stockout cost	RM100 per unit
Inventory holding cost	RM15 per unit at end of month
Hiring workers	RM800 per worker
Firing workers	RM200 per worker
Unit cost (Material)	RM35 per unit
Overtime	RM20 per hour (No change in production rate per unit regardless of regular time and overtime)

The company currently has 9 workers. Each worker can produce 20 units of product A on regular time (160 hours) capacity per month. Each worker on the payroll costs RM2000 per month. Beginning stock indicates a balance of 240 units.

Which production plans is better:
a) Plan I, using level strategy with overtime when is required. However, overtime must not exceed more than 2 units per worker per month. Stockout is not allowed. Excessive inventory will be stored in the warehouse.

(12 marks)

b) Plan II, using level for first three months without overtime then switches to chase strategy. The warehouse now constraints the maximum allowable inventory on hand at the end of each month to 100 units or less.

(13 marks)

[Total: 25 marks]

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QUESTION 4

3V Chair Manufacturer has just received orders for finished chairs (Figure 4.1, Table 4.1 and 4.2). Each chair consists of front legs assembly, seat and back supports assembly. 3V is a chairs assembly plant and all the items are supplied from the suppliers across · Malaysia.
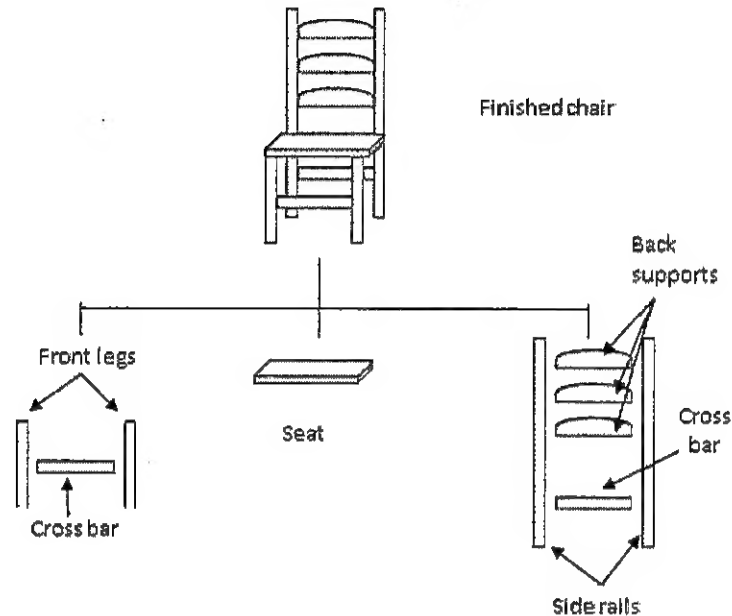

Figure 4.1: Assembly diagram of chair

Table 4.1: Summary of orders received for chair

Month 2018	Jan	Feb	Mar	Apr	May	Jun
Forecast	10	0	50	20	0	50
Customer Orders (booked)	0	0	80	20	0	30

Table 4.2: Inventory Record Data

Data Category	Finished chair	Front legs	Cross bar	Seat ·	Side rails	Back supports
Lot sizing rule	100	POQ ·(P=3)	FOQ=300 units	FOQ=20 units	POQ (P=4)	L4L
Lead time (LT)	1 month	2 months	1 month	1 month	3 months	2 months ·
Scheduled Receipts	0	20 (in month March)	0	0	50 (in · month January)	0
Beginning inventory	20	0	0	15	37	10

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Based on the information in figure 4.1, solve the following

a) Product Structure Tree (with Lead Time and quantity).

(5marks)

b) Master Production Schedule for finished chair, using the Table A. When and what quantity should 3V start production of finished chairs.

(5 marks)

c) Material Requirement Planning for i) side rails, ii) back supports and iii) cross bar using Table B. When and what quantity should 3V order from suppliers?

(15 marks)

(Students are required to apply the Table A and B provided in the question booklet, and attach them together with the answer booklet for submission)

[Total: 25 marks]

QUESTION 5

A project has the following activities, times and precedence relationships.

Activity	Normal Time (Days)	Crash Time (Days)	Normal Cost (RM)	Crash Cost (RM)	Immediate Predecessor (s)
A	3	2	1000	1600	None
B	2	1	2000	2700	None
C	1	1	300	300	None
D	7	3	1300	1600	A, C
E	6	3	850	1000	B
F	2	1	4000	5000	C
G	4	2	1500	2000	D, E

Solve the following problems

a) Draw a precedence diagram for the project. How many days are required to complete the project?

(5 marks)

b) Compute the earliest start times, earliest finish times, latest start times, latest finish times and slack times. Write these values in the precedence diagram.

(10 marks)

c) Crash the project to 10 days at the least cost and estimate the project cost.

(5 marks)

d) Crash the project to lowest possible days and estimate the project cost.

(5 marks)

[Total: 25 marks]

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TABLE A & B

Table A: Master Production Schedule for _____

Lot size:	Month								
Lead Time:									
Forecast									
Customer Orders									
On-hand Inventory									
MPS quantity									
MPS start									
Available to promise (ATP)									

Table A: Master Production Schedule for _____

Lot size:	Month								
Lead Time:									
Forecast									
Customer Orders									
On-hand Inventory									
MPS quantity									
MPS start									
Available to promise (ATP)									

Table B: Material Requirement Planning for _____

Lot Size:	Month								
Lead Time:									
Gross requirements									
Scheduled receipts									
On-hand Inventory									
Planned order receipts									
Planned order releases									

Table B: Material Requirement Planning for _____

Lot Size:	Month								
Lead Time:									
Gross requirements									
Scheduled receipts									
On-hand Inventory									
Planned order receipts									
Planned order releases									

Continued...

Table B: Material Requirement Planning for _____

Lot Size:	Month								
Lead Time:									
Gross requirements									
Scheduled receipts									
On-hand Inventory									
Planned order receipts									
Planned order releases									

Table B: Material Requirement Planning for _____

Lot Size:	Month								
Lead Time:									
Gross requirements									
Scheduled receipts									
On-hand Inventory									
Planned order receipts									
Planned order releases									

Table B: Material Requirement Planning for _____

Lot Size:	Month								
Lead Time:									
Gross requirements									
Scheduled receipts									
On-hand Inventory									
Planned order receipts									
Planned order releases									

Table B: Material Requirement Planning for _____

Lot Size:	Month								
Lead Time:									
Gross requirements									
Scheduled receipts									
On-hand Inventory									
Planned order receipts									
Planned order releases									

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